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AMSAT NEWS SERVICE
ANS-332

The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT, The Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on http://www.amsat.org publishes news of Amateur Radio in Space as soon as our volunteers can post it.

Please send any amateur satellite news or reports to: ans-editor(a)amsat.org

You can sign up for free e-mail delivery of the AMSAT News Service Bulletins via the ANS List; to join this list see: https://mailman.amsat.org/postorius/lists/ans.amsat.org/

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ANS-332 AMSAT News Service Weekly Bulletins

To: All RADIO AMATEURS
From: Radio Amateur Satellite Corporation
712 H Street NE, Suite 1653
Washington, DC 20002

DATE 2021 November 28

The AMSAT Journal, September/October 2021 Now Available

The September/October 2021 issue of The AMSAT Journal is now available to members on AMSAT's Member Portal. The AMSAT Journal is a bi-monthly digital magazine for amateur radio in space enthusiasts, published by the Radio Amateur Satellite Corporation (AMSAT). Each issue is your source for hardware and software projects, technical tips, STEM initiatives, operational activities, and news from around the world. Inside this issue:

- Apogee View - Robert Bankston, KE4AL
- The Life and Legacy of Tom Clark, K3IO (SK) - Bob McGwier, N4HY
- Dr. Thomas A. Clark, K3IO - Remembering a Superstar - Richard M. Hambly, W2GPS
- Remembering Tom Clark - Barry A. Baines, WD4ASW
- Mourning the Passing of Dr. Thomas A. Clark - Frank Bauer, KA3HDO
- Full Function Remote Control of a Satellite Base Station - Mark Johns, K0JM

Members can read this issue and all back issues of the AMSAT Journal by logging in at https://launch.amsat.org/The_AMSAT_Journal.

Note yet a member? Start reading the Journal today by joining at https://launch.amsat.org/Membership.

[ANS thanks Joe Kornowski, KB6IGK, AMSAT Journal Editor-in-Chief.]

AMSAT President's Apogee View Celebrates 2020-2021

Robert Bankston, KE4AL, AMSAT President writes:

"This issue of The AMSAT Journal marks my first year as AMSAT President, so I thought I would take this opportunity to update you on what we've been working on, where we are now, and what we will focus on in the coming year.

"Our Engineering team has been making significant progress on our GOLF program, and we hope to see the launch of GOLF-TEE in the latter half of next year. Under the leadership of our Vice-President of Engineering, Jerry Buxton, N0JY, our volunteer engineers have worked tirelessly to develop, prototype, and test GOLF-TEE's systems. I thank each and every one of them for donating their time and expertise.

"Not to be outdone, our Educational Relations team completed its beta testing on the CubeSat Simulator and launched the CubeSat Simulator printed circuit board set on the AMSAT Store. Dr. Alan Johnston, KU2Y, and his team have done a phenomenal job. In addition, as announced at this year's symposium, they have not only developed and released the new CubeSatSim Lite version, but Dr. Johnston and his team have begun to experiment with high altitude balloon launches to take the CubeSatSim concept to the next level of educational initiatives.

"Behind the scenes, we have been busy modernizing back-office tasks, finding ways to more efficiently do business, and ensuring the AMSAT machine runs smoothly. To be honest, running AMSAT without Martha has been a significant challenge.

"Our modernization efforts, which really began with the May 2020 launch of our online member management system, have been the key to our overall success this year. Transforming a 52 year old organization from brick and mortar to virtual was no easy task and not without a few hiccups along the way, but we are better positioned moving forward. It was a sad day packing up the AMSAT office in Kensington, Maryland, in May and putting everything in storage. To touch all that history reaffirmed why we do what we do.

"I look forward to both the challenges and opportunities that lie ahead. AMSAT is in a very solid position from both a financial and a membership perspective. We have a strong fiscal foundation, an excellent governance and management team, generous volunteers who freely donate their time and expertise, and a diverse membership base who truly care about keeping amateur radio in space.

"Financially, we are on a solid footing, with over $950,000 in cash and liquid investments. Our revenues are down from last year, as is the rest of the U.S. economy; however, we are on track to exceed our profitability margin over last year because of the cost-cutting measure we implemented. In 2020, $0.82 of every dollar went to pay overhead. In 2021, that amount was reduced to $0.56 for every dollar we brought in â€“ a 31% reduction. This means a lot more of your membership dues and revenues we develop from other sources are going towards building satellites and expanding our educational efforts.

"AMSAT membership has consistently been over 4,000 the past year, with 4,045 current members as of this writing. AMSAT's membership is diverse, representing 76 countries. While each comes for varied reasons (builders and operators, scientists and educators, HEO and LEO), we all come together for a single purpose: to keep amateur radio in space. So, what's next? With over 52 years of success, what are we going to do now?

"We have an ambitious, forward-thinking plan (www.amsat.org/strategicplan/) that's ready to be put into action. Central to this plan are the needs to modernize how we manage projects and explore ways to collaborate with our international partners, given current ITAR/EAR restrictions.

"In addition, as an all-volunteer member organization, we need help. While we have a solid core of volunteers now, expanding our programs will require additional human resources and added expertise. I will be addressing this in the next issue of The AMSAT Journal, but if you cannot wait, please feel free to contact me directly. We would love to have you join our team.

"Our greatest threat right now is the ever-tightening regulatory environment. It is one thing to hope to return to higher orbits and even beyond, but all of this will be for naught if we can't get a satellite licensed in orbit above LEO. Proposed orbital debris mitigation regulations will require orbits above 600 kilometers to have a flight-proven, low-risk transfer orbit, long-term reentry capability, and/or improved move-away-and-stay-away storage options for orbital lifespans more than 25 years. However, proving you can get there and operate responsibly will not be enough. Every mission will be closely evaluated to ensure it serves the greater benefit of all, which, at this time, strongly favors commercial, scientific and educational interests. Thankfully, our engineers had the foresight to develop the GOLF program for this very purpose.

"While we await the FCC's final ruling, we cannot sit idly by and be content with mediocrity. Instead, we must continue to push Onward and Upward. We should focus our efforts on new communication systems that more efficiently allow us to communicate in space and spacecraft which will take us towards and beyond the next space horizon. At the same time, we must establish and maintain a path of sustainability that not only introduces space communications using amateur radio to the public but also nurtures them to be the next generation of satellite builders and operators.

"On a side note, I had the pleasure of attending and speaking at the 2021 AMSAT-UK Space Colloquium on October 24th. It was an incredible event, and AMSAT-UK did a phenomenal job of hosting the virtual event. In addition to the extraordinary work being done by the Surrey Space Center team on their STAR-XL project, the operators chasing QO-100, and Peter, 2M0SQL's, roving efforts in Northern Scotland, we were treated to presentations on IARU Amateur Satellite co-ordination by Hans Blondeel Timmerman, PB2T, and an AMSAT-DL update, by Peter Guelzow, DB2OS. If you missed the AMSAT-UK Colloquium, I encourage you to view it on AMSAT-UK's YouTube Channel, www.youtube.com/user/AMSATUK/videos.

"Let me close with personally thanking all of our members, who generously donated to the AMSAT President's Club this year, and our Vice-President of Development, Frank Karnauskas, N1UW, who single-handedly resurrected this program and managed to raise over $33,000. I look forward to what Frank can do for next year."

[ANS thanks Robert Bankston, KE4AL, AMSAT President for the above information.]

FUNcube-1 (AO73) Celebrating Eight Years in Orbit!

November 21, 2021, marks the eighth birthday of the FUNcube-1 CubeSat. Remarkably the tiny spacecraft, launched from Russia on November 21, 2013, continues to work well having travelled more than a billion kilometers in space.

During the past couple of months, the spacecraft's orbits have been running just along the edge of the terminator. Initially it had effectively full sun with no eclipses but at the beginning of this month it appears that the solar panels were not receiving enough solar radiation to keep the battery fully charged.

FUNcube-1 was transmitting continuous high-power telemetry and was therefore consuming maximum power. The FUNcube Dashboard showed the rapid decline in the bus voltage from an already below normal 8.0V down to 7.8V. The spacecraft was switched to safe mode on the afternoon of November 18, 2021. This reduced to total power consumption by almost 50% and the spacecraft is again in a happy power positive situation.

Although safe mode provides less than 20mW of downlink RF, it is remarkable how many stations are still receiving and decoding the 1k2 BPSK telemetry. This is a good point at which to say a massive thank you to the many stations around the world who, even after eight years, are continuing to submit their data to the FUNcube Data Warehouse. It really is valuable to the team and has really helped us to understand what is going on up there.

The team will continue to monitor the telemetry over the next few weeks and plan to return FUNcube-1 to nominal autonomous operation, with the transponder on when the spacecraft is in eclipse, as soon as possible.

Interestingly, it appears that the satellite will not be having any more full sunlight periods for the foreseeable future. However, those that we have experienced have provided some good data on how hot a

1U CubeSat can become in such circumstances!

[ANS thanks AMSAT-UK for the above information.]

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NASA's ELaNa 46 mission. Come along for the ride. The journey will be
worth it!

https://tinyurl.com/ANS-GOLF

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Upcoming Satellite Operations

FN51: November 27-28, 2021
KC1MEB on Cape Cod, MA. No schedule as of this time.

EM86, November 20-30, 2021
WY7AA: DM RJ for a sched.

[ANS thanks Paul Overn, KE0PBR, AMSAT rover page manager, for the above information]

Hamfests, Conventions, Maker Faires, and Other Events

ARRL National 2022 Convention & Orlando Hamcation
February 11-13, 2021
Central Florida Fairgrounds and Expo Park, Orlando, Florida

[ANS thanks Paul Overn, KE0PBR, AMSAT Events page manager, for the above information]

Satellite Shorts From All Over

+ Congratulations to Chris Polena, AA8CH, in EN62vp48, and Jose Rodriguez, EB1AO, in IN52pe28, for setting the new AO-27 distance record of 6,125 km on November 20, 2021 at 21:30 UTC! Distance records may be seen at https://www.amsat.org/satellite-distance-records/.
[ANS thanks Paul Stoetzer, N8HM, AMSAT Executive VP, for the above information.]

+ Satellite trackers have been working overtime to figure out just how much dangerous debris Russia created when it destroyed one of its own satellites early Monday - and the picture they've painted looks bleak. Computer visualizations of the debris cloud can be viewed at https://bit.ly/3FNuFZU.
[ANS thanks The Verge for the above information.]

+ CaribouLite is an affordable, open-source, dual-channel software-defined radio (SDR) platform”and an SDR-focused FPGA development framework" implemented as a Raspberry Pi (RPi) HAT. CaribouLite turns a Raspberry Pi single-board computer (SBC) into a self-contained, dual-channel radio Tx/Rx that spans a wide tunable frequency spectrum up to 6 GHz. The full version comes with two TX/RX half-duplex channels, with channel one covering 30 MHz to 6 GHz, and channel two covering sub 1 GHz only. Both channels use a 13-bit ADC, capable of a bandwidth of up to 2.5 MHz maximum. The unit is capable of up to 14 dBm of transmit power. More information at https://tinyurl.com/ANS-332-CaribouLite.
[ANS thanks RTL-SDR.com for the above information.]

+ GNU Radio Conference 2021 was a great success, with around 100 in-person attendees and over 1000 remote attendees!
Talks were split between in-person and remote (pre-recorded). All talks are now available to watch on YouTube. A playlist that includes all videos can be seen at https://tinyurl.com/ANS-332-GRCON.
[ANS thanks gnuradio.org for the above information.]

+ Russia's Prichal docking module linked up with the International Space Station Friday, November 26, 2021 adding the final planned piece of the Russian segment of the outpost to provide a new connection for future crew and cargo ships. The spherical, ball-shaped docking node launched Wednesday on top of a Russian Soyuz-2.1b rocket from the Baikonur Cosmodrome in Kazakhstan. More information at https://tinyurl.com/ANS-332-PRICHAL.
[ANS thanks spaceflightnow.com for the above information.]

Join AMSAT today at https://launch.amsat.org/

In addition to regular membership, AMSAT offers membership to:

* Societies (a recognized group, clubs or organization).
* Primary and secondary school students are eligible for membership at one-half the standard yearly rate.

* Post-secondary school students enrolled in at least half time status shall be eligible for the student rate for a maximum of 6 post-secondary years in this status.
* Memberships are available for annual and lifetime terms.

Contact info [at] amsat.org for additional membership information.

73 and remember to help Keep Amateur Radio in Space!

This week's ANS Editor, Frank Karnauskas, N1UW
n1uw at amsat dot org